DOCUMENT RESUME

ED 391 147 CS 012 333

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TITLE	Metalinguistic Awareness and Literacy Acquisition in Different Languages. Technical Report No. 618.
INSTITUTION	Center for the Study of Reading, Urbana, IL.
PUB DATE	Nov 95
NOTE	10p.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Bilingualism; Cross Cultural Studies; Elementary Education; Higher Education; *Language Acquisition; Language Role; *Languages; *Literacy; *Metalinguistics; *Reading Processes; Reading Research; *Reading Writing Relationship
IDENTIFIERS	*Emergent Literacy; Phonemic Awareness

ABSTRACT

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Center for the Study of Reading

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Abstract

Defining metalinguistic awareness as the ability to reflect on and manipulate the structural features of language, this article examines the hypothesis that the metalinguistic demands of learning to read are shaped by the structure of a language and its associated writing system. The article examines the relationship between phonemic awareness and alphabetic literacy, for example in English, and the role of metalinguistic awareness and non-alphabetic literacy, for example, in Chinese. The ways that bilingualism increases certain aspects of metalinguistic awareness are also examined. The article concludes by noting an instructional implication of the metalinguistic hypothesis: that it is the youngest, least advantaged, least able children who will benefit most from instruction that helps them become aware of the structure of their writing system and its relationship to their spoken language.

METALINGUISTIC AWARENESS AND LITERACY ACQUISITION IN DIFFERENT LANGUAGES

This report examines the role of metalinguistic awareness in learning to read, and how this role is shaped by the nature of the writing system and the structure of the language. Metalinguistic awareness is the ability to reflect on and manipulate the structural features of language. Different aspects of metalinguistic awareness can be defined with respect to particular language features. For example, a child's level of syllable awareness might be measured by asking the child to count the number of syllables in a word, or to say what the word would sound like if the initial syllable were removed. Syntactic awareness might be assessed by asking children to correct errors in the order of words in a sentence.

Metalinguistic awareness is not typical of normal language use; people usually attend to the message being conveyed rather than to the linguistic elements which convey it. The normal process by which one produces or understands language does not generate answers to metalinguistic questions such as "How many words were in that sentence?" or "How many phonemes were in that word?"

Learning to read, on the other hand, is fundamentally metalinguistic. The child must first of all realize *that* print represents speech, and then work out the details of *how* print represents speech. Understanding the mapping between print and speech in a given writing system requires finding out what linguistic units are represented by the elements of written language -- whether the marks on the page represent phonemes, syllables, morphemes, or something else. To profit from literacy instruction, the child must also be able to make sense of metalinguistic terms such as *word*, *(speech) sound*, and *syllable*.

Some children appear to arrive spontaneously at the metalinguistic insights underlying reading, but many children do not. In the last few decades, a large body of research on children learning to read in alphabetic writing systems has demonstrated the crucial role played by *phonemic awareness* -- recognition that letters typically map onto phonemes.

We will review research on the role of phonemic awareness in alphabetic literacy. We will then discuss, in necessarily more speculative terms because of the paucity of research, the kinds of metalinguistic insight that should underlie successful literacy in other writing systems, and consider the extent to which other types of metalinguistic awareness may play roles analogous to that played by phonemic awareness in learning to read in an alphabetic writing system. We will close with some comments on the role of metalinguistic awareness in children learning to read in a second language.

Phonemic Awareness and Alphabetic Literacy

One of the major advances during the last 25 years of research on early literacy has been recognition of the important role played by phonemic awareness in learning to read in an alphabetic writing system (Brady & Shankweiler, 1991). Phonemic awareness is one of the strongest predictors of success in learning to read, stronger, for instance, than measures of IQ and home background. However, the nature of the relationship between phonemic awareness and learning to read is complex, and still a matter of debate.

Some researchers have argued that phonemic awareness is a prerequisite for, and cause of, success in learning to read. This position seems only logical: Learning the mappings between letters and phonemes presupposes the concept of phoneme. Support comes from training studies in which children who receive instruction aimed at developing phonemic awareness show a significant advantage in their later progress in learning to read. On the other hand, a number of researchers have noted that

phonemic awareness typically arises only in the context of instruction in an alphabetic writing system; hence it seems it should be considered an outcome, rather than a cause, of learning to read (Bowey & Francis, 1991).

This apparent paradox can be resolved by postulating a reciprocal relationship between phonemic awareness and learning to read. The alphabetic insight is gained as the learner tries to understand how letters map onto speech. Although the concept of phoneme is essential to the alphabetic insight, letters provide a scaffold for the development of this difficult concept. It is the process of beginning to learn to read that draws the child's attention to letters, sounds, and their relationships, enabling the insight which unlocks the system.

Phonological awareness--a more general concept of awareness of sound units, whether words, syllables, onsets and rimes, or phonemes--plays a crucial role in this process. Developing the concept of phoneme and learning the mappings between letters and sounds depend on the ability to attend to the sounds of words, and to analyze these sounds into components. It is not surprising to find, therefore, that training in awareness of sound units larger than phonemes accelerates growth in reading. Furthermore, it can be questioned whether the youngest children's representations of words involve phoneme-sized units at all. Rather, words may be represented initially in terms of larger units, which are analyzed into phonemes only as discriminations within the child's growing lexicon make this necessary.

Although understanding of the alphabetic principle may sometimes be experienced as a sudden insight (Feitelson, 1988), the ability to segment words into phonemes and knowledge of the myriad relationships between specific letters and sounds develop incrementally over a period of time. Phonological awareness plays a crucial role not just in the initial insight into the nature of the writing system, but also in the extended process of learning the complex mappings between letters and sounds (Share, 1995).

The development of phonemic awareness may be influenced by the orthographic and phonological structure of the language. For example, four-year-old Italian children are superior to American children in tasks requiring syllable segmentation; this presumably reflects the simpler syllable structure of the Italian language. On the other hand, an increase in the Italian children's advantage over Americans at phoneme segmentation during first grade may reflect the benefit of learning to read in a more regular orthography (Cossu et al., 1988). Phonemic awareness may also be easier for Italian than American children because analysis of a syllable into onset and rime isolates individual phonemes far more often in Italian than it does in English.

There are two reasons why phonemic awareness plays such a critical role in alphabetic literacy. The fundamental one is simply that in alphabetic systems the elements of the writing system map onto phonemes. A contributing reason is that phonemic awareness is neither easily, nor universally, attained. Children are able to perform tasks that require them to identify or manipulate syllables well before they can perform analogous tasks involving phonemes. Syllable awareness is typically found in children before they begin reading instruction, whereas, as mentioned above, phonemic awareness normally appears only in conjunction with learning to read in an alphabetic writing system.

Functional awareness of phonemes is difficult to achieve for several reasons. One is that many phonemes are difficult or impossible to pronounce in isolation (e.g., consonants such as /p/, /t/, or /k/). Another is that phonemes are abstract linguistic entities with a variety of acoustic and articulatory realizations. The /t/ in *tame* is not the same sound as the /t/ in *train*. The short a in *pat* is not the same as the short a in *pan*. Perhaps most crucially, words are neither heard, nor pronounced, as sequences of discrete units. A sound spectrogram of the word *cat* does not show three components; the acoustic information identifying the consonants overlaps in time with that identifying the vowel.

Metalinguistic Awareness and Non-Alphabetic Literacy

By analogy with the role of phonemic awareness in alphabetic literacy, it might be expected that awareness of syllables would be crucial to learning to read in a syllabary (a writing system in which there is a unique symbol for each syllable in the spoken language). Likewise, in the Chinese writing system, in which characters map onto morphemes, morphological awareness should be the aspect of metalinguistic awareness that is most closely related to literacy.

The available research supports this general picture. For example, measures of syllable awareness are highly correlated with reading ability for Japanese children (whose initial reading involves symbols representing syllables), but not for American children (Mann, 1986). Conversely, measures of phonemic awareness are more strongly related to literacy for American or British children than they are for Japanese or Chinese children (Huang & Hanley, 1994).

Clues provided by the internal structure of Chinese words and characters are potentially very helpful to young readers. About 80-90% of the characters in modern Chinese have a component called a *radical* that gives a clue to meaning. Large groups of characters, sometimes numbering more than one hundred, share the same radical. For example, the characters for *bark, kiss, shout, sing,* and *drink* have the same radical which means mouth. Shu and Anderson (in press) found that by the third grade many Chinese children have a functional awareness of the relationship between the radical in a character and the meaning of the character. Children rated by their teachers as making average or better progress in reading are able to use radicals to learn and remember familiar characters and figure out the meanings of unfamiliar characters.

Another helpful feature of Chinese morphology is that the majority of words are composed of two or more characters which usually contribute in a clear way to the meaning of the whole word. For example, the two-character word signifying *beef* consists of the characters for *cattle* and *meat*. Furthermore, words containing the same character often form predictable word families. The character for *meat*, for instance, also appears in *pig-meat* (pork) and *sheep-meat* (mutton). Hatano, Kuhara, and Akiyama (1981) asked Japanese students to match compound words, such as leukemia, with their definitions. Students performed better when words were presented in Kanji, the Japanese version of Chinese characters--for example the three character word for leukemia that literally means white-blood-disease--than in Kana, the Japanese syllabary. It seems the morphological information in the characters which comprise compound words helps readers to determine meanings.

However, there are reasons why one might not expect syllabic awareness to play a role in Japanese literacy, or morphological awareness to play a role in Chinese and Japanese literacy, completely analogous to that of phonemic awareness in an alphabetic writing system. First, phonological representations have a privileged role in reading. Studies of reading in English and Chinese suggest that, despite differences in writing systems, phonological representations play a role in lexical access and other comprehension-related processes (Perfetti & Zhang, in press).

Phonemic awareness is an especially difficult linguistic insight, undoubtedly more difficult than syllable awareness and quite possibly more difficult than awareness of Chinese radicals. Because syllabic awareness is attained early, easily, and more or less universally, its role in literacy acquisition in a syllabic writing system cannot be completely analogous to that of phonemic awareness in an alphabetic writing system. Japanese beginning readers do not need the same kind of help with syllable awareness that American beginning readers need with phonemic awareness.

Competing hypotheses could be formulated concerning whether awareness of the morphology of Chinese is more or less difficult than phonemic awareness. Almost every Chinese character represents a morpheme and maps onto a single syllable. Since syllable awareness is easier than phonemic awareness,

this should mean that the Chinese writing system is less of a hurdle for the beginning reader, at least as far as insight into the nature of the system is concerned. Moreover, morphemes are units of meaning, and in that sense are less abstract than phonemes. For this reason, the insight that characters map onto morphemes should be easier to attain than the insight that letters map onto phonemes. On the other hand, morphological awareness involves simultaneously attending to sound and meaning, a task which is difficult for young children (Derwing & Baker, 1979).

Another complication in the relationship between writing systems and particular aspects of metalinguistic awareness is that many widely used writing systems are mixed--that is, they cannot be seen as purely phoneme-based, or syllable-based, or morpheme-based. Thus, more than one facet of metalinguistic awareness can be expected to make a contribution to learning to read. The English writing system, for example, is not purely alphabetical; it is partly morpheme-based. A writing system is morpheme-based to the extent that a morpheme maintains the same graphic form despite having different pronunciations. English is full of such instances, that is, pairs of words such as *electric* and *electricity* or *resign* and *resignation*, which maintain the same spelling for a shared morpheme despite differences in pronunciation. Similarly, the suffix *-ed* is spelled the same despite its different pronunciations in *raised*, *raced*, and *rated*.

A writing system also must be considered morphologically-based to the extent that different morphemes with the same pronunciation are given distinct written representations. Again, examples are not hard to think of: *their* and *there*; *here* and *hear*; *see* and *sea; sign* and *sine; buy*, *bye* and *by*; *sight*, *cite*, and *site*; and *sew*, *so*, and *sow*. Given the partially morphological basis of the writing system, it is not surprising to find that morphological awareness makes an independent contribution to learning to read English (Carlisle & Nomanbhoy, 1993).

Nevertheless, especially in the matter of compound words, English morphology does not seem as generally consistent, productive, or semantically useful as Chinese and Japanese morphology, or even the morphology of other alphabetic languages such as German. Therefore, one would not expect morphological awareness to be as important in learning to read English as it is in learning to read these other languages.

Japanese is perhaps the clearest example of a mixed writing system. Kana characters constitute a syllabary that children find easy to learn. Kanji, on the other hand, are phonologically opaque; they contain no clues to pronunciation. Hence, although syllable awareness is highly correlated with initial success in learning to read Japanese, morphological awareness will be a stronger predictor of success in learning to read Kanji, as we expect it to be for learning to read in Chinese.

The Chinese writing system is also mixed, but in a way different from Japanese. Japanese uses two distinct systems, one syllable-based, and one morpheme-based. In Chinese, there is a single, but complex, system: although each character represents a morpheme, the majority of characters also include some information about their pronunciation (see articles on Writing Systems A2, I10).

Metalinguistic Awareness and Second Language Reading

Many school children, perhaps even the majority of children in the world, learn to read in a language different from the one they have learned at home. Because of the difficulties facing second-language readers, it is especially important to identify potential strengths and capitalize on these wherever possible. Some of these strengths involve or depend on metalinguistic awareness.

Bilingualism increases certain aspects of metalinguistic awareness. In fact, there is at least some evidence that even limited exposure to a second language can promote types of metalinguistic awareness

that contribute to reading (Yelland, Pollard, & Mercuri, 1993), though simple exposure to two languages does not appear to guarantee a metalinguistic advantage (Göncz & Kodzopeljic, 1991).

Skillful bilingual readers are those who can effectively transfer skills and knowledge gained in one language to reading in the other language. Transfer of useful information from one language to another may be mediated by metalinguistic awareness.

We have found, for example, that phonological awareness of Spanish-speaking children in Spanish predicted their ability to learn to read words in English (Durgunoğlu, Nagy, & Hancin-Bhatt, 1993). Similarly, morphological awareness may enable speakers of Spanish learning to read English to capitalize on the many lexical similarities between the two languages. Though Spanish-English bilingual children in American schools usually recognize some cognate relationships, cognate recognition is far from automatic or consistent. We have found that students' recognition of cognate relationships increases far more rapidly between grades 4 and 8 than their vocabulary knowledge in either Spanish or English, suggesting strongly that cognate recognition is dependent on a relatively sophisticated level of metalinguistic awareness that cannot be assumed to be universally present in grade 4 children (Hancin-Bhatt & Nagy, 1994).

Metalinguistically aware second-language readers will be in a position to capitalize on overlaps between their first and second languages. Appearances can be deceiving, however, so the second language reader who looks for simple one-to-one correspondences between the two languages will often go astray. Further metacognitive and metalinguistic sophistication is required to check interpretations against context and knowledge of the topic, but the same can be said about first-language readers trying to use the known to chart the unknown. Thus, though learning to read in a second language offers increased opportunities for metalinguistic awareness, it also places additional metalinguistic demands on the learner. Children with limited metalinguistic awareness may be especially vulnerable in second-language reading acquisition, and attention to the metalinguistic demands of second-language literacy is therefore all the more important.

Concluding Remarks

This article has examined the hypothesis that the metalinguistic demands of learning to read are shaped by the structure of a language and its associated writing system. The hypothesis gives a good account of a variety of data, although it must be acknowledged that data about learning to read nonalphabetic languages are scarce and that there are several perplexities that have not been resolved.

An instructional implication of the metalinguistic hypothesis is this: It is the youngest, least advantaged, least able children who will benefit most from instruction that helps them become aware of the structure of their writing system and its relationship to their spoken language.

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